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**RISK ASSESSMENT  
AIRBORNE ASBESTOS  
NEW VERNON ROAD AND WHITE BRIDGE ROAD SITES  
MORRIS COUNTY, NEW JERSEY**

**Prepared By:  
USEPA REGION II  
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ABD 001 1746 F

## EXECUTIVE SUMMARY

This Risk Assessment (RA) addresses exposure to asbestos in air at the New Vernon Road and White Bridge Road Sites in Meyersville, New Jersey. These sites are two of four subsites that comprise the Asbestos Dump Superfund Site.

The RA evaluated inhalation of air containing maximum concentrations of asbestos under a residential land-use scenario. Current and future land-use was assumed to be the same. Due to a lack of toxicity information, only carcinogenic risks posed by asbestos were evaluated in the RA.

The potential carcinogenic risk was evaluated using the cancer unit risk value developed by the EPA for asbestos. The cumulative upper bound risks associated with potential exposures to maximum asbestos concentrations in the air at the New Vernon Road and White Bridge Road Sites are  $1 \times 10^{-2}$  and  $3 \times 10^{-3}$  respectively. The potential risks due to carcinogens at the site are therefore, greater than the acceptable EPA risk range of  $10^{-4}$  to  $10^{-6}$ .

The procedures and inputs used to assess risks in the RA, as in all such assessments, are subject to a wide variety of uncertainties. These uncertainties were addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the RA provides upper bound estimates of the risks to populations near the sites, and is highly unlikely to underestimate actual risks related to the sites.

## **SITE BACKGROUND**

The Asbestos Dump Site is a National Priority List Site which includes four properties in southeastern Morris County, New Jersey. These four properties are the Millington Site, the Dietzman Tract, the New Vernon Road Site and the White Bridge Road Site. Currently, the Asbestos Dump project is divided into three operable units. A Record of Decision (ROD) for the first operable unit, the Millington Site, was signed on September 30, 1988. The properties of the second operable unit are the New Vernon Road and White Bridge Road Sites. The Dietzman Tract comprises the third Operable Unit.

This Risk Assessment (RA) addresses exposure to asbestos in the air at the New Vernon Road and White Bridge Road properties; the Dietzman Tract is not included in this study.

The New Vernon Road property consists of about 30 acres of land located at 237 and 257 New Vernon Road in Meyersville, New Jersey. The property is bounded by New Vernon Road to the west, a portion of The Great Swamp National Wildlife Refuge to the north, and tracts of wooded and wetland areas to the east and south. One residence and a business are currently located on-site. One private residence is located directly south of the New Vernon Road property; another residence is located southwest of the property to the south of a tennis club; both residents are located on the opposite side of New Vernon Road.

The White Bridge Road property consists of approximately 12 acres of land at 651 White Bridge Road in Meyersville, New Jersey. This property is bounded by White Bridge Road to the north, the Great Swamp National Wildlife Refuge to the east and southeast, Black Brook to the southwest and a vacant wooded lot to the west. One private residence and a business are located on-site. Five private residences are located approximately 700 feet north and west of the property.

Further details regarding the site location are available in the June 1991 Focused Remedial Investigation Reports.

## **HAZARD IDENTIFICATION**

This RA evaluates the exposure to airborne asbestos at the sites. The potential risk currently exists for an individual to be exposed to asbestos in the air. The exposure pathways evaluated in this assessment represent current-use as well as potential future-use exposure pathways. The inhalation of asbestos in the air was evaluated for adult on-site residents.

Asbestos was the only contaminant determined to be present in the air at the site. The maximum concentrations of asbestos detected

in the air at each site were used in the risk assessment and are listed in Table 1. This results in conservative estimates of the actual concentrations, and correspondingly conservative estimates of the health risks associated with asbestos in the air at the New Vernon and White Bridge Road Sites.

**Table 1**  
**ASBESTOS CONCENTRATIONS USED IN RISK ASSESSMENT**

Site	Air			
	Sample Location	Sampling Period	Volume Collected (liters)	Concentration (fib/cc)
New Vernon Road	**Personal	1425-1720	520	0.063
White Bridge Road	**Personal	1410-1720	380	0.012

\* The concentrations used represent the maximum detected concentration reported in the RI. The sampling method used is NIOSH 7400; the analytical method is phase contrast microscopy (PCM). PCM detects only fibers longer than 5 um and >0.4 um in diameter. The detection limit is 0.01 fibers/cc. Furthermore, PCM is a nonspecific technique and will measure any fibrous material.

\*\* Sample was collected using personal monitoring equipment.

## EXPOSURE ASSESSMENT

### 1.0 Approach

The procedures used to calculate exposures have been reviewed by the Office of Health and Environmental Assessment of the U.S. EPA. Default parameters for calculating exposures have been extracted from EPA's Risk Assessment Guidance for Superfund (RAGS) (EPA/540/1-89/002; December 1989), Superfund Exposure Assessment Manual (SEAM) (EPA/540/1-88/001; April 1988), and Exposure Factors Handbook (EFH) (EPA/600/8-89/043; March 1989).

Exposure is defined as contact with a chemical or physical agent. The magnitude of exposure is determined by measuring or estimating the amount of an agent available for absorption at the lungs, gut, or skin, not the amount absorbed.

Two different methods are used to calculate exposure. Average Daily Exposure (ADE) is an average exposure computed for the period over which exposure occurs, and is used to calculate risks for non-cancer toxic effects. Lifetime Average Daily Exposure (LADE), used to calculate carcinogenic risk, takes into account the fact that while carcinogenic hazard values are determined with an assumption of lifetime exposure, actual exposure may be over a shorter period.

$$\text{ADE} = (\text{Contaminant Concentration} \times \text{Contact Rate}) / \text{Body Weight}$$

$$\text{LADE} = \text{ADE} \times (\text{Exposure Period in Years}) / \text{Lifetime}$$

Contact Rate is the amount of the contaminated medium (water, air, food) with which a person comes into contact (generally a daily average) for the period of exposure (i.e., liters of water ingested per day, kilograms of food ingested per day, cubic meters per day of air inhaled). Both ADE and LADE are generally expressed in units of milligrams of the contaminant available for absorption, per kilogram of body weight, per day.

An exposure pathway combines contamination in an environmental medium, a scenario describing how a person contacts that medium, and a route of exposure (oral, inhalation, or dermal). In order for an exposure pathway to be complete, all of the elements of an exposure pathway must be present. Currently at the New Vernon Road and White Bridge Road Sites, the potential exists for an adult individual to be in contact with contaminated air. The exposure pathway evaluated in this assessment is complete at the present time, and represents potential current-use as well as future-use exposure pathways. The pathway evaluated is the inhalation of contaminated air for adult residents of the sites.

## 2.0 Parameters

The exposure values reflect not only the concentrations of contaminants in various environmental media and the exposure pathways selected for analysis, but also the specific numerical parameters applied to each exposure scenario.

The current and future land-use scenario is the same in this case. Adult residents were evaluated for the site. The risk assessment was based on the use of maximum observed concentrations of asbestos in the air at the New Vernon Road and White Bridge Road Sites during Remedial Investigation activities in October 1990. The 95% upper confidence limit was not used, as the data were limited. EPA default values were used, in the absence of site-specific information.

## DOSE-RESPONSE ASSESSMENT

Potential carcinogenic risks are evaluated using the cancer unit risks and/or slope factors developed by the EPA for chemicals of concern. Cancer unit risks (URs) and slope factors (SFs) have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. A unit risk establishes the relationship between the dose of a chemical and the response. The UR (Table 2), which in the case of asbestos is expressed in units of (fibers/cc)<sup>-1</sup>, is multiplied by the asbestos concentration in fibers/cc, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that concentration. The term "upper bound" reflects the conservative estimate of the risks calculated from the UR.



**Table 2**  
**Toxicity Values for Asbestos**

**INHALATION REFERENCE CONCENTRATION (RfC) FOR ASBESTOS**

Not available at this time. (IRIS 3/19/91; HEAST Annual FY91)

**INHALATION CANCER SLOPE FACTOR (SF) FOR ASBESTOS**

**Weight-of-Evidence Classification -- A; human carcinogen**

**Inhalation Unit Risk --  $2.3 \times 10^{-1}$  per (fibers/ml) (IRIS 3/19/91)**

The unit risk is based on fiber counts made by phase contrast microscopy (PCM) and should not be applied directly to measurements made by other analytical techniques. For both the New Vernon Road Site and the White Bridge Road Site, the asbestos calculations were based on the PCM method.

The unit risk was based on the assumption of a 20 m<sup>3</sup>/day inhalation rate.

## RISK CHARACTERIZATION

This section assesses the potential risk to human health associated with exposure to asbestos in the air at the New Vernon Road and White Bridge Road Sites under the No-Action Alternative (i.e., no remedial activity). The risks addressed in this risk assessment represent potential current and future land use exposure scenarios. Because of the lack of non-cancer toxicity factors, only a carcinogenic risk was estimated for the New Vernon Road and White Bridge Road Sites.

### Calculation of the Carcinogenic Risk

For known or suspected carcinogens, the USEPA considers excess upper bound individual lifetime cancer risks of between  $10^{-4}$  to  $10^{-6}$  to be acceptable. This level suggests that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of exposure to site conditions. The potential carcinogenic risk associated with air exposures at the New Vernon Road and White Bridge Road Sites are presented in Table 3.

The cumulative upper bound risks associated with potential exposures to maximum asbestos concentrations in air at the New Vernon Road and White Bridge Road Sites are  $1 \times 10^{-2}$  (one in a hundred) and  $3 \times 10^{-3}$  (three in a thousand) respectively. The potential risks due to asbestos at the site are significantly greater than the acceptable EPA risk range of  $10^{-4}$  to  $10^{-6}$ .

Table 3

Calculation of Cancer Risk Associated with Potential Exposures  
to Asbestos in the Air

Site	Adult Resident
New Vernon Road	$1 \times 10^{-2}$
White Bridge Road	$3 \times 10^{-3}$

Cancer Risk = Asbestos Air Concentration x Unit Risk

## UNCERTAINTIES

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Environmental chemistry analysis error can stem from several sources including errors inherent in the analytical methods and characteristics of the matrix being sampled. Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media samples. In this case, the risk assessment was based on maximum detected asbestos concentrations.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure. The risks to an adult resident were calculated for these sites assuming exposure 365 days per year. Uncertainties in toxicological data that occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals.

These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the RA provides upper bound estimates of the risks to populations near the sites and is highly unlikely to underestimate actual risks related to the site.

## CONCLUSIONS

The Risk Assessment (RA) addressed exposure to asbestos in air at the New Vernon Road and White Bridge Road Sites in Meyersville, New Jersey.

The RA evaluated inhalation of air containing maximum detected concentrations of asbestos under a current and future residential land-use scenario. Due to a lack of toxicity information, only carcinogenic risks were evaluated in the RA.

The cumulative upper bound risk associated with potential exposures to maximum asbestos concentrations in air at the New Vernon Road and White Bridge Road Sites are  $1 \times 10^{-2}$  and  $3 \times 10^{-3}$  respectively. The potential risks due to asbestos at the sites are greater than the acceptable EPA risk range of  $10^{-4}$  to  $10^{-6}$ .

The procedures and inputs used to assess risks in the RA, as in all such assessments, are subject to a wide variety of uncertainties. These uncertainties were addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the RA provides upper bound estimates of the risks to populations near the sites, and is highly unlikely to underestimate actual risks related to asbestos at the sites.